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Technical Memorandum

To: Julie Lucas and Dan Kort, Hibbing Taconite Company
 From: Rachel Walker, Kevin Menken, Dan Engel, and Christie Kearney, Barr Engineering Company
 Subject: 2011 Wild Rice Survey for Hibbing Taconite Company
 Date: December 22, 2011
 Project: 23/69-1242
 c: George Pruchnofski, Barr Engineering Company
 Dave Skolasinski, Cliffs Natural Resources

Introduction

Hibbing Taconite Company (Hibbing Taconite) received a letter from the Minnesota Pollution Control Agency (MPCA) dated May 23, 2010 requesting a literature review and wild rice (*Zizania palustris* L.) field survey of receiving waters (Study Area) downstream from Hibbing Taconite's facility near Hibbing, MN; this letter is included as Attachment A. These receiving waters are associated with Hibbing Taconite's tailings basin area, which is permitted under NPDES Permit MN0049760.

The wild rice field survey and water quality monitoring results are presented in this memorandum and include observations of the following water bodies as listed in the MPCA letter and shown on Figure 1:

- SD-001: Unnamed Creek to Shannon River to Lost Pond to Shannon River to Shannon Lake (hereafter referred to as the Shannon River system)
- SD-002/SD-003/SD-004: Rock Lake Creek (SD-002) / Kleffman Lake (SD-003) / Unnamed Creek (SD-004) to Deer Creek to Day Lake to Day Brook to Prairie River to Crooked Lake to Prairie River to Lawrence Lake to Lower Lawrence Lake to Prairie River to Prairie Lake (hereafter referred to as the Day Brook system)

Hibbing Taconite hired Barr Engineering Company (Barr) to conduct this literature review and wild rice field survey.

Literature Review

Barr reviewed publicly available documents containing information on the presence and absence of wild rice. The Minnesota Department of Natural Resources (DNR) Fisheries maintains files and reports related to Study Area water bodies at the DNR office in Grand Rapids, Minnesota. Wild rice

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investigational reports with regional or statewide significance were downloaded from digital or internet sources.

Literature Review Findings: DNR Lake/Stream Survey Files

Each DNR Fisheries Office maintains files on select surface waters within its management zone; the following is a summary of the documentation reviewed from each Study Area water body file.

Unnamed Creek

Multiple files were located for waters named “Unnamed Creek” in the DNR Fisheries Office in Grand Rapids; no vegetation data were recorded in any of the files.

Shannon River

A file for Shannon River could not be located in the DNR Fisheries Office in Grand Rapids.

Lost Pond

A file for Lost Pond was located in the DNR Fisheries Office in Grand Rapids; no vegetation data were recorded in the file.

Shannon Lake

A file for Shannon Lake was located in the DNR Fisheries Office in Grand Rapids. A 1986 Lake Survey Report lists wild rice as “Abundant” in Shannon Lake.

Rock Lake Creek

A file for Rock Lake Creek could not be located in the DNR Fisheries Office in Grand Rapids.

Kleffman Lake

A file for Kleffman Lake was located in the DNR Fisheries Office in Grand Rapids; no vegetation data were recorded in the file.

Deer Creek

A file for Deer Creek could not be located in the DNR Fisheries Office in Grand Rapids.

Day Lake

A file for Day Lake was located in the DNR Fisheries Office in Grand Rapids.

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Vegetation data were listed for lake surveys from 1974, 1978, 1979. No observations of wild rice were recorded for Day Lake.

Day Brook

A file for Day Brook was located in the DNR Fisheries Office in Grand Rapids; no vegetation data were recorded in the file.

Prairie River

A file for Prairie River was located in the DNR Fisheries Office in Grand Rapids; no vegetation data were recorded in the file.

Crooked Lake

A file for Crooked Creek was located in the DNR Fisheries Office in Grand Rapids. A 1953 Lake Survey Report includes a list of aquatic vegetation, but wild rice was not listed. A 1980 Lake Survey Report notes that the "southeast bay has heavy growth of rice." An aquatic plant survey, conducted in 2000 by the Minnesota County Biological Survey, documents the presence of wild rice in Crooked Lake.

Lawrence Lake

A file for Lawrence Lake was located in the DNR Fisheries Office in Grand Rapids. DNR Lake Survey Reports from 1974 and 1984 list wild rice as an abundant species in Lawrence Lake. An aquatic plant survey, conducted in 2000 by the Minnesota County Biological Survey, documents the presence of wild rice in Lawrence Lake.

Lower Lawrence Lake

A file for Lower Lawrence Lake was located in the DNR Fisheries Office in Grand Rapids. A 1972 Lake Sounding Report lists wild rice as "common vegetation." A 1974 Lake Survey Report lists wild rice as "abundant" for Lower Lawrence Lake.

Prairie Lake

A file for Prairie Lake was located in the DNR Fisheries Office in Grand Rapids. An aquatic plant survey, conducted in 2000 by the Minnesota County Biological Survey, documents the presence of wild rice in Prairie Lake.

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Literature Review Findings: Regional Resource Documents

In addition to the DNR Fisheries Office files, wild rice investigational reports with regional or statewide significance were also reviewed. Many of the documents reviewed did not contain any information about wild rice within the Study Area. Information pertaining to wild rice from the reviewed reports is included below. The following documents were reviewed:

Investigational Report #22. Moyle. 1941. *Report on Minnesota Wild Rice for 1940*. Bureau of Fisheries Research, Division of Game and Fish

- Shannon River was listed as a wild rice resource; no further information was included.

Investigational Report #40. Moyle. 1942. *The 1941 Minnesota Wild Rice Crop*. Bureau of Fisheries Research Division of Game and Fish

- Shannon River was listed as a wild rice resource; no further information was included.

2008 Natural Wild Rice in Minnesota Report – DNR

- Crooked Lake was listed as a wild rice resource, with 12 acres of rice.
- Lawrence Lake was listed as a wild rice resource, with 19 acres of rice.
- Shannon Lake and Shannon River were listed as wild rice resources, with a combined total of 108 acres of wild rice.

2008 Natural Wild Rice Harvester Survey – DNR

- None of the Study Area waters were listed in this report as a wild rice resource.

2009 Wild Rice Resource Guide (3rd Ed.) – 1854 Treaty Authority.

- None of the Study Area waters were listed in this report as a wild rice resource.

2010 Wild Rice Management Workgroup's "350 Significant Wild Rice Waters in Minnesota"

- Prairie Lake was listed as a wild rice resource; no further information was given.
- Prairie River was listed as a wild rice resource; no further information was given.
- Shannon Lake was listed as a wild rice resource, with the highest density of rice occurring at the southeast corner of the lake.

Literature Review Conclusion

A review of regional resource documents and DNR Fisheries Office files indicates that wild rice has been documented in the following water bodies of the Study Area: Shannon River, Shannon Lake, Prairie River, Crooked Lake, Lawrence Lake, Lower Lawrence Lake, and Prairie Lake.

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Field Survey Methodology

The purpose of the qualitative survey and water quality sampling was to document the presence or absence of wild rice and its relative stand density, as well as to collect surface water samples for sulfate analysis in or near wild rice stands. The method used was similar to one used by the 1854 Treaty Authority, “Wild Rice Monitoring and Abundance in the 1854 Ceded Territory (1998 – 2008)” and other vegetation plot data surveys designed to quantify *in situ* plant species (e.g., *A Handbook for Collecting Vegetation Plot Data in Minnesota: The Relevé Method* (Minnesota Department of Natural Resources, 2007)).

In the May 23, 2010 letter (Attachment A), the MPCA requested that the survey “observe whether wild rice is actually present in all waters potentially impacted by the discharges that were determined to have potential for wild rice, either based on the literature search above or those that have characteristics which may encourage wild rice production”. When wild rice was encountered during field observations, field crews recorded the GPS location, documented the location, took photographs, and recorded a brief description of the wild rice stand. Additionally, dominant vegetation was noted along the water bodies surveyed. Attachment B provides a list of common names for the scientific names included in this memorandum.

The MPCA’s May 23, 2010 letter also requested that Hibbing Taconite “attempt to collect at least one grab sample in each water body where wild rice is found to be present” and analyze the sample for sulfate. Therefore, surface water samples were collected at the first significant stand of wild rice encountered on each stream system. Water samples were sent to Pace Analytical Laboratory in Virginia, Minnesota and analyzed for sulfate (SO_4^{2-}).

A wild rice density rating on a scale of 1 to 5 was applied to each observation of wild rice. The density rating was used to qualitatively assess the density of wild rice over a given area and is expressed as an approximate percent coverage of wild rice. Density ratings used in this study are defined in Table 1 and shown by example in the photos included in Attachment C. As discussed above, a similar method was used by the 1854 Treaty Authority; however, the 1854 Treaty Authority only surveyed known wild rice water bodies and did not include reconnaissance of small stream systems.

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Table 1: Wild Rice Density Scale

Wild Rice Density Rating	Description
1	<10% Wild Rice Coverage
2	10 – 25% Wild Rice Coverage
3	25 – 50% Wild Rice Coverage
4	50 – 75% Wild Rice Coverage
5	>75% Wild Rice Coverage

The two stream systems identified by the MPCA in the May 23, 2011 letter consist of approximately 85 river miles. In a willingness to focus the fieldwork on wild rice stands that could become the point of water quality compliance, the MPCA agreed with Hibbing Taconite by phone that the field surveys could be discontinued on each water system once a significant stand of wild rice was observed downstream of the Hibbing Taconite's discharge points on each system. In accordance with this MPCA-approved scope modification, the field surveys began at the NPDES water quality monitoring locations and progressed downstream until a significant wild rice stand was observed. In the absence of an MPCA definition for a "significant stand," Hibbing Taconite and Barr have defined a significant stand of wild rice for this survey as a stand with a density rating of 3 or greater (wild rice coverage of 25 percent or greater).

For the 2011 field survey described in this memorandum, an initial evaluation of the Study Area water bodies was conducted by reviewing aerial photographs to identify access points and potential property issues. Aerial photographs were also used to get a preliminary understanding of stream conditions prior to the field visit; to corroborate what was seen in the field during the field visit; and to evaluate and document channel conditions along stream stretches that were not navigable by kayak and too difficult to access on foot.

Every stream section in the Study Area was surveyed by kayak or on foot where accessible. Some of the stream reaches were not navigable by kayak or too difficult to access on foot due to the physical characteristics of the habitat. These same characteristics that limited physical access to certain stream sections are also characteristics that limit the suitability of habitat for wild rice growth and include:

- Very low water levels (less than 1 foot);
- Predominantly rocky or sandy substrate;
- Narrow channel conditions with little to no open water often due to thick vegetation growth (*Typha* spp., *Phalaris arundinacea*, *Calamagrostis canadensis*, etc.) or channel morphology;

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- Algal growth;
- Dense overhanging vegetation; and
- The presence of forest species such as *Alnus* spp., *Fraxinus nigra*, *Betula* spp., *Picea mariana*, and *Populus tremuloides*.

Wild rice typically grows in open water with direct sunlight. Other conditions that favor wild rice growth include some flowing water (water bodies with an inlet and an outlet), water depths ranging from 1 to 4 feet, and predominantly mucky substrate. Stream reaches that were not navigable by kayak or difficult to access by foot were surveyed by consulting aerial photographs and by observing stream conditions at available road crossings, as described below.

The field survey was conducted between August 23 and August 31, 2011. The method of survey and descriptions of each water body's channel characteristics are described below. Figure 2 identifies the locations where wild rice was found during the field survey and indicates the density of the stand at each location. Figure 3 lists the density of each stand, approximate size of each stand, and sulfate concentrations at each significant stand. Photographs of select stands are included in Attachment D.

Field Survey Findings

On the Shannon River system, wild rice was first observed in the northeast corner of Lost Pond at a density rating of 2 (stand SHR-A, Figures 2 and 3), which classifies it as an insignificant stand of wild rice for this study. This stand was approximately 0.28 acres in size. The first significant stand of wild rice was observed further downstream on Shannon River at SHR-B (Figures 2 and 3). This stand had a density rating of 4 and was approximately 0.92 acres in size. The field survey was discontinued on the Shannon River system a short distance downstream after wild rice was encountered at SHR-B at a density rating of 4.

On the Day Brook system, wild rice was first observed downstream of Day Lake (see Figures 2 and 3). There were nine isolated insignificant stands identified along Day Brook (stands DB-A through DB-I) prior to the first significant stand. These nine small stands each had a density rating of 1 and approximate wild rice stem counts ranging from one to 40, with a mean of 15 stems per stand (see Figure 3). The first significant stand of wild rice was found in Day Brook (DB-J), approximately 11.5 river miles downstream of Day Lake (see Figures 2 and 3). This stand had a density rating of 4 and was approximately 0.10 acres in size.

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Shannon River System (water bodies are listed upstream to downstream)

Unnamed Creek (downstream of SD-001) - Surveyed 8/23/2011

No wild rice was observed. Unnamed Creek was surveyed from SD-001 at Highway 5, downstream to the confluence with Shannon River. The upstream half of Unnamed Creek was surveyed by kayak. The downstream half of Unnamed Creek was surveyed by foot, where shallow water, rocky stream channel, and thick shrub vegetation made navigation by kayak impossible. Unnamed Creek ranged from three to 10 feet wide and from six to 36 inches deep. Dominant vegetation included *Typha* spp., *Alnus incana*, and *Phalaris arundinacea*. This stream did not have habitat conducive to the growth of wild rice.

Shannon River – Surveyed 8/23/2011 and 8/24/2011

Shannon River was surveyed by kayak from the confluence with Unnamed Creek, through Lost Pond (see description below), to Hannon Road (downstream of the significant wild rice stand identified with a density of 4). The first significant stand of wild rice identified on the Shannon River were observed approximately 1.5 river miles downstream of Lost Pond with a density rating of 4, as seen in Figures 2 and 3. Water sample HT-SHR-JDS-01 was collected in the middle of the wild rice stand with a density rating of 4 (stand SHR-B on Table 2 below and Figures 2 and 3). Other dominant vegetation in this stand included *Nuphar advena*, *Potamogeton* spp., *Sparganium* spp., and *Scirpus* spp. At the wild rice stand SHR-B, the water temperature was 67°F, water depth was approximately 24 inches, and wild rice extended about 32 inches above the water level.

Table 2: Shannon River System Wild Rice Stands

Wild Rice Observation Point	Survey Date	Wild Rice Density Rating	Approximate Stand Size	Water Quality Sample ID	Sulfate Concentration (mg/L)
SHR-A	8/24/2011	2	0.28 acres	LP Inlet*	5.89 mg/L*
SHR-B	8/25/2011	4	0.92 acres	HT-SHR-JDS-01	2.09 mg/L

*This sample was taken by Hibbing Taconite on 8/16/2011 prior to the wild rice survey.

Lost Pond – Surveyed 8/24/2011

Wild rice was observed in the northeast corner of Lost Pond, which is part of the Shannon River system (Figures 2 and 3). The stand of wild rice (stand SHR-A on Table 2 and Figures 2 and 3) had a wild rice density rating of 2. Water temperatures at the wild rice stand averaged 72°F, and the average water depth near the stand was 33 inches. Rice plants extended 12 to 18 inches above the water level and had few or no grains on the stem; most were unripened at the time of the survey. Other dominant vegetation included *Nymphaea odorata*, *Lemna minor*, *Ceratophyllum* spp., *Nuphar advena*, *Potamogeton* spp., and

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algae. A wild rice stand with a density rating of 2 was not considered significant for this survey (see Methodology), so the wild rice survey continued downstream in the Shannon River.

On August 16, 2011, prior to Barr conducting the wild rice survey, Hibbing Taconite conducted voluntary surface water quality monitoring at Lost Pond. Surface water sample LP Inlet was collected from the inlet to Lost Pond (immediately upstream of the wild rice stand) and sent to Pace Analytical Laboratory in Virginia, Minnesota for analysis. The concentration of sulfate in the sample was 5.89 mg/L.

Shannon Lake

Shannon Lake is downstream of the significant stand of wild rice identified in the Shannon River system (SHR-B) and was therefore not surveyed in accordance with the survey protocol.

Day Brook System (water bodies are listed upstream to downstream)

Rock Lake Creek – Surveyed 8/26/2011

No wild rice was observed. Rock Lake Creek flows from near SD-002 into Deer Creek immediately upstream of Day Lake. The creek was evaluated based on previous observations (2009 and 2010) of the upstream third of the stream near HTC's mitigation wetlands, by surveying from a kayak at the confluence with Deer Creek, and by consulting aerial photographs for the remainder of the stream. Based on visual observations at both ends of the creek as well as an aerial photo review, the stream channel was approximately three to 10 feet wide in most areas, with some wider sections of channel (up to 25 feet) behind each of five beaver dams. The dominant vegetation visually observed was *Phalaris arundinacea* in the channel with *Alnus incana* on the banks, which appear to continue along the entire channel according to aerial photos. Low water levels, narrow open water channel due to thick vegetation, adjacent wetlands, and overhanging vegetation precluded navigation of the entire stream by kayak or on foot. Based on field observations and aerial photography review, no areas of suitable wild rice habitat were identified in this stream.

Kleffman Lake (downstream of SD-003) – Surveyed 8/31/2011

No wild rice was observed. Kleffman Lake is a small lake connected to the Deer Creek watercourse. The entire perimeter of Kleffman Lake was surveyed by kayak.

Unnamed Creek (downstream of SD-004) – Surveyed 8/31/2011

No wild rice was observed. The creek was surveyed on foot from SD-004 upstream of Kleffman Road and continued for a distance of approximately 1,000 feet downstream of County Highway 39. The stream

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was also surveyed by foot at its confluence with Deer Creek. Aerial photographs were then consulted to evaluate the remaining approximately 2,500-foot reach between these surveyed sections. Based on the reaches that were physically surveyed, the channel was approximately three to six feet wide and one to three feet deep. Dense vegetation populated the channel including *Typha* spp., *Alnus incana*, *Calamagrostis canadensis*, and *Phalaris arundinacea*, which precluded navigation by kayak and made survey on foot very difficult. Based on the reaches that were surveyed by foot and the aerial photograph review, the 2,500-foot section of stream not physically surveyed consisted of very similar habitat. The narrow channel conditions with little to no open water due to thick vegetation and overhanging vegetation (*Alnus* spp.) are characteristics that limit the suitability of habitat for wild rice growth in this channel.

Deer Creek – Surveyed 8/25/2011 and 8/31/2011

No wild rice was observed. Deer Creek was surveyed at road crossings, by kayak, by foot, and by consulting aerial photographs. The creek was surveyed by foot at the confluence with Unnamed Creek up to Day Brook system mile 1.0. There were two large drained ponded areas at the confluence with Unnamed Creek with former beaver dams upstream of the ponded areas. These large ponded areas have been overgrown with *Phalaris arundinacea*.

From mile 1.0 to about mile 3.4, there were no road crossings or access points to the creek. The stream was too narrow at mile 1.0 to kayak, with large wetland areas on either side of the channel, making it difficult to access on foot. At mile 3.5, the channel ranged from three to six feet wide and was overgrown with *Phalaris arundinacea*. There were wetlands on both sides of the channel consisting of dense stands dominated by *Phalaris arundinacea*. Aerial photographs were reviewed to identify changes in habitat; however, the aerial photographs show that the habitat is very similar throughout this stretch with a narrow channel and thick vegetation (*Phalaris arundinacea*) on either side of the channel. These characteristics limit the suitability of the habitat for wild rice.

Deer Creek was surveyed by foot from mile 3.5 to approximately mile 3.7 from an unnamed road. The channel width ranged from three to six feet with *Phalaris arundinacea* in the channel and along channel banks, which extended to wetlands on both sides of the channel.

From mile 3.7 to about mile 4.0, the channel was too narrow to kayak and the large wetland areas on either side of the channel made access on foot very difficult. Aerial photographs showed that the habitat along this stretch was very similar to the stretch between mile 1.0 and mile 3.4, with a narrow channel and

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thick vegetation (*Phalaris arundinacea*) on either side of the channel. These characteristics limit the suitability of the habitat for wild rice.

Deer Creek was surveyed by kayak from mile 4.0 to its outlet at Day Lake. The channel ranged in size from five to ten feet wide and one to three feet deep. There were numerous beaver dams along the channel with wetland immediately adjacent to the channel along most of the creek.

Based on the field observations by kayak and on foot and through the review of aerial photographs, the creek did not provide areas suitable for wild rice.

Day Lake – Surveyed 8/25/2011

No wild rice was observed. The entire perimeter of Day Lake was surveyed by kayak. The water was at least 12 inches lower than normal based on vegetation and water marks on rocks. The shoreline was undeveloped, with mostly native forest and forested swamp. Dominant vegetation along the shoreline included *Typha* spp., *Sagittaria graminea*, *Leersia oryzoides*, *Potamogeton* spp., *Scirpus* spp., *Phalaris arundinacea*, *Calamagrostis canadensis*, *Carex* spp., *Nuphar advena*, and *Nymphaea odorata*.

On August 16, 2011, prior to Barr conducting the wild rice survey, Hibbing Taconite conducted voluntary surface water quality monitoring at Day Lake. Surface water samples were collected at the inlet (DL inlet) and outlet (DL outlet) of Day Lake (upstream of the wild rice observed in Day Brook) and sent to Pace Analytical Laboratory in Virginia, Minnesota for analysis. The concentration of sulfate in the Day Lake inlet sample was less than the laboratory method reporting limit for sulfate of 1.0 mg/L, and the concentration of sulfate in the Day lake outlet sample was 3.24 mg/L.

Day Brook – Surveyed 8/25/2011, 8/26/2011, 8/27/2011 and 8/30/2011

Day Brook was surveyed from the outlet at Day Lake, downstream to its intersection with Wolf Lake Trail (Figure 2). The channel substrate ranged from sandy to rocky and in some locations mucky sediments were observed. Water levels appeared to be lower than normal based on vegetation and water marks on rocks, which made navigation by kayak difficult in some areas. The stream width of Day Brook varied from five to 15 feet. The stream was also overgrown by *Alnus incana* in the channel and along the banks in some areas.

Several insignificant stands of wild rice with a wild rice density rating of 1 were observed in Day Brook (DB-A through DB-I), upstream of the first significant stand of wild rice (see Figures 2 and 3). These

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nine small stands had approximate wild rice stem counts ranging from one to 40, with a mean of 15 stems per stand (see Table 3).

The first significant stand of wild rice in Day Brook was found approximately 11.5 river miles downstream of Day Lake (stand DB-J on Table 3 and Figures 2 and 3). This stand had a density rating of 4 and was approximately 0.10 acres in size. Water sample HT-DB-KDM-01 was collected at stand DB-J (see Table 3). The wild rice was densest near shore at this first significant stand with an average water temperature of 77°F and average water depth of 26 inches. The substrate observed in areas of dense wild rice growth was soft and mucky. Additional wild rice stands immediately downstream of stand DB-J continued for several hundred yards at density ratings between 5 and 1.

Table 3: Day Brook Wild Rice Stands

Wild Rice Observation Point	Survey Date	Wild Rice Density Rating	Approximate Stand Size	Water Quality Sample ID*	Sulfate Concentration (mg/L)*
DB-A	8/25/2011	1	10 plants	---	---
DB-B	8/27/2011	1	20 plants	---	---
DB-C	8/27/2011	1	10 plants	---	---
DB-D	8/27/2011	1	40 plants	---	---
DB-E	8/27/2011	1	10 plants	---	---
DB-F	8/30/2011	1	1 plant	---	---
DB-G	8/30/2011	1	1 plant	---	---
DB-H	8/30/2011	1	30 plants	---	---
DB-I	8/30/2011	1	10 plants	---	---
DB-J	8/30/2011	4	0.10 acres HT-DB-KDM-01	< 1.0 mg/L	**

*Hibbing Taconite collected voluntary surface water samples on 8/16/2011 in Day Lake, which is upstream of stand DB-A. Sulfate concentrations were less than the method reporting limits of 1.0 mg/L at the inlet (DL Inlet) and 3.24 mg/L at the outlet (DL Outlet) of Day Lake.

**Method reporting limits were 1.0 mg/L; at less than 1.0 mg/L, sulfate was not detected.

The following water bodies were downstream from the significant stand of wild rice in Day Brook (DB-J) and were therefore not surveyed, in accordance with the survey protocol:

- Prairie River
- Crooked Lake
- Lawrence Lake
- Lower Lawrence Lake
- Prairie Lake

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Field Survey Summary

The wild rice survey for Hibbing Taconite consisted of documenting the presence or absence of wild rice in the following water bodies (Figure 1):

- the Shannon River system (downstream of SD-001) and
- the Day Brook system (downstream of SD-002, SD-003, and SD-004).

Fieldwork was completed between August 23 and August 31, 2011 and consisted of evaluating 32 miles of stream, two lakes, and one large pond by kayak, on foot, or through examination of aerial photographs combined with surveys by kayak or by foot. This survey began at the permitted outfalls and continued downstream in each river system until a significant wild rice stand having a wild rice density rating of 3 or greater (25 percent density or greater) as defined in this study was located.

The first occurrence of a significant stand of wild rice in the Shannon River system was observed in Shannon River, between Lost Pond and Shannon Lake. The first occurrence of a significant wild rice stand in the Day Brook system was observed in Day Brook, approximately 11.5 river miles downstream of Day Lake.

Barr Engineering and Hibbing Taconite collected surface water samples at the significant stands of wild rice as well as immediately upstream of the first observance of wild rice in both the Shannon River system and the Day Brook system. These samples were analyzed for sulfate concentrations at Pace Analytical Laboratory in Virginia, Minnesota. Laboratory results indicate that sulfate concentrations at the first significant stand as well as upstream of the first occurrence of wild rice in both the Shannon River system and the Day Brook system are all less than the current wild rice standard of 10 mg/L.

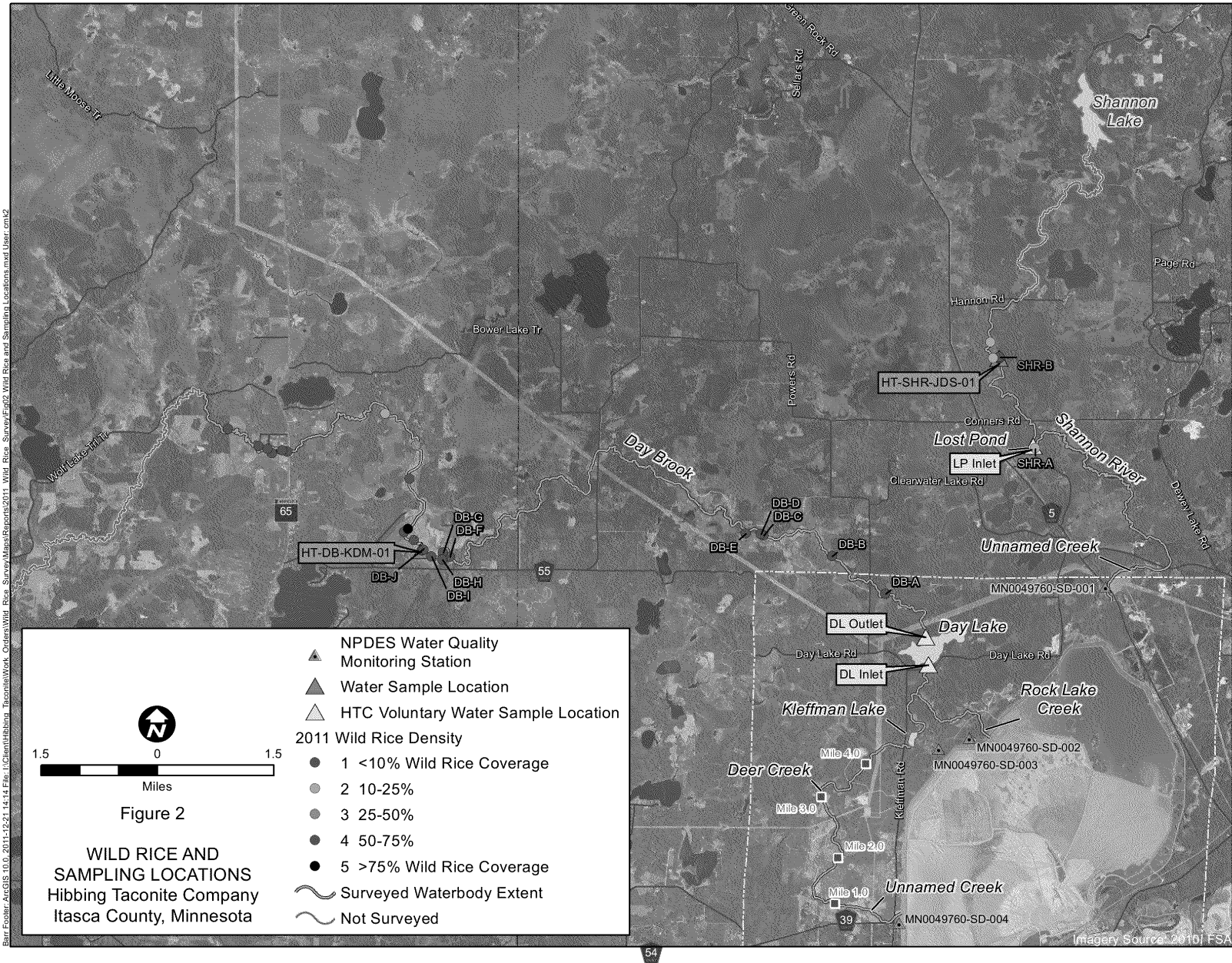
Figures

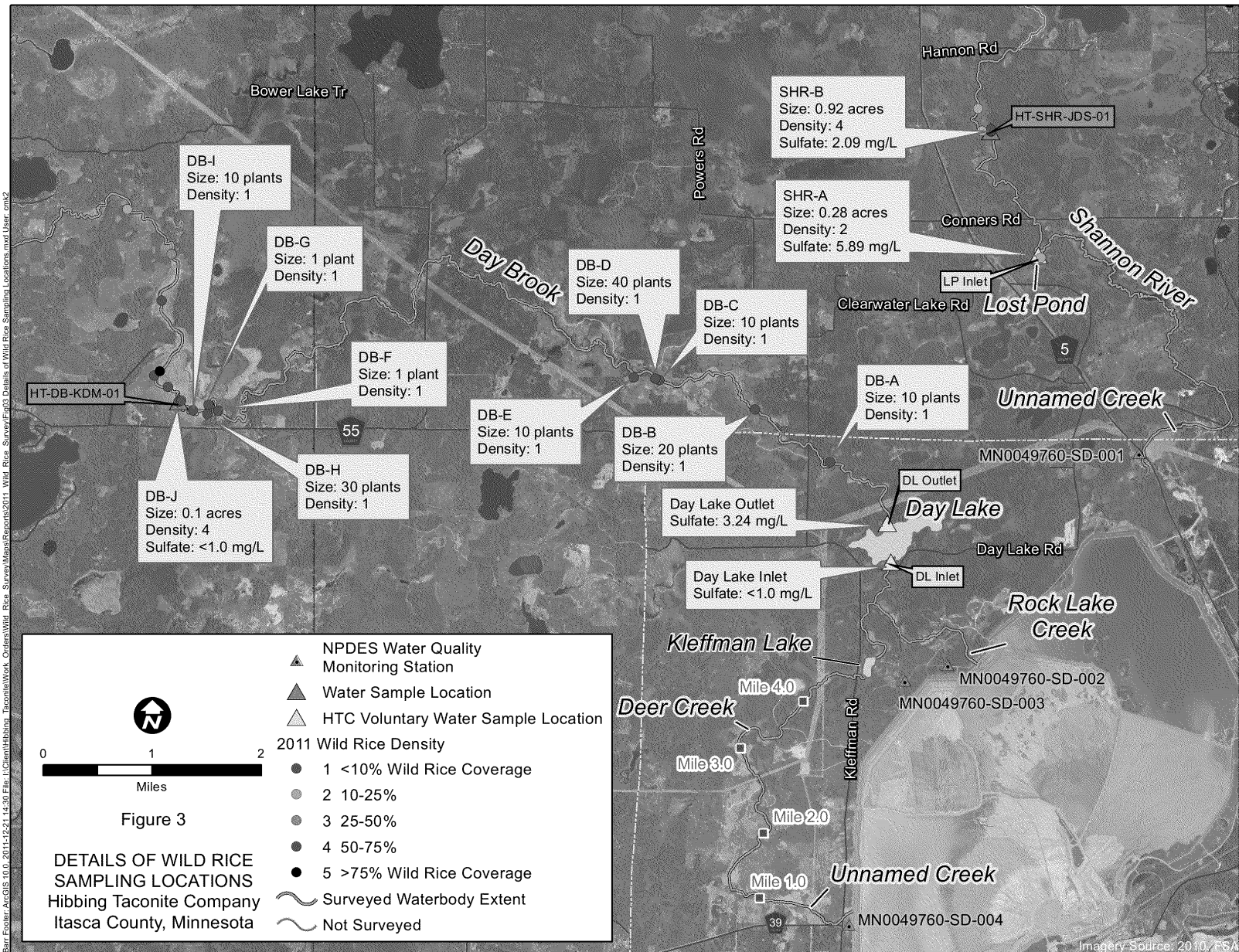
Figure 1: Wild Rice Study Area

Figure 2: Wild Rice and Sampling Locations

Figure 3: Details of Wild Rice Sampling Locations







Attachment A

MPCA Letter (May 23, 2011)



Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

May 23, 2011

Ms. Julie Lucas, Environmental Manager
Hibbing Taconite Company
4950 County Highway 5 North, PO Box 589
Hibbing, MN 55746-0589

RE: NPDES/SDS Permit No. MN0049760
Hibbing Taconite Co. – Tailings Basin Area
Request for Information on Wild Rice

Dear Ms. Lucas:

The Minnesota Pollution Control Agency (MPCA) will soon begin the process of reissuing the Hibbing Taconite Tailings Basin Area National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) permit. One of the goals of the MPCA is to protect surface waters used for the production of wild rice. Over the last several months, MPCA staff has been working to develop guidance to help determine, on a case-by-case basis, what waters of the state are “used for the production of wild rice” and subject to the 10 mg/L sulfate standard under Minn. R. 7050.0224, Subp. 2. Such waters may be located downstream of the Hibbing Taconite tailings basin facility.

Due to concerns regarding the concentration of sulfate in tailings basin discharges and the resulting potential for impact to wild rice resources, the MPCA is requesting the company gather additional information on the presence of wild rice in waters downstream of the tailings basin discharges including conducting a literature search to identify waters potentially containing wild rice followed by a field survey of those waters identified in the literature search. This information will be important for the permitting process to ensure that appropriate water quality standards are applied and to ensure that surface waters, including those used for the production of wild rice, are adequately protected.

We are requesting the company include the following receiving waters, including any adjacent wetland areas, in the literature search and, as appropriate, in the subsequent field surveys:

MN0049760 Hibbing Taconite Co. Tailings Basin Area:

- SD-001: Unnamed Creek to Shannon River to Lost Pond to Shannon River to Shannon Lake.
- SD-002 / SD-003 / SD-004: Rock Lake Creek (SD-002) / Kleffman Lake (SD003) / Unnamed Creek (SD004) to Deer Creek to Day Lake to Day Brook to Prairie River to Crooked Lake to Prairie River to Lawrence Lake to Lower Lawrence Lake to Prairie River to Prairie Lake.

Ms. Julie Lucas
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May 23, 2011

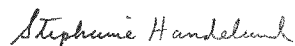
The company should provide the following information to the MPCA:

1. A literature search for wild rice in the downstream receiving waters listed above potentially impacted by the discharges. Some data sources that may be used to determine the potential for wild rice impacts include Appendix A of the "2008 DNR Wild Rice Report," the most recent "DNR Wild Rice Harvester Survey," and the "1854 Treaty Authority List." For waters listed in the "DNR Wild Rice Report," Gary Drotts at 218-833-8620 and Ann Geisen at 218-833-8625 may be contacted to gather all the available Department of Natural Resources (DNR) data on those sites. Information on any active or proposed DNR management activities designed to establish, protect, or enhance the wild rice resources of these waters would be helpful.
2. A field survey to observe whether wild rice is actually present in all waters potentially impacted by the discharges that were determined to have potential for wild rice, either based on the literature search above or those that have characteristics which may encourage wild rice production. When the field survey is conducted, it should be conducted by a qualified professional and should take into account the cyclic nature of the growth of this aquatic plant.
3. The results of water quality monitoring for sulfate in the waters potentially impacted by the discharges in which wild rice is found to be present. The company should attempt to collect at least one grab sample in each water where wild rice is found to be present.

The wild rice literature search and field survey work should be conducted in 2011. The company may incorporate results from previous wild rice survey work that may have been done in the recent past as part of its submittal.

We appreciate your cooperation in this matter. If you have any questions regarding this request, please contact me at 651-757-2405 or by e-mail at stephanie.handeland@state.mn.us.

Sincerely,



Stephanie Handeland
Hydrologist
Land and Water Quality Permits Section
Industrial Division

SH:Img

cc: John Thomas – MPCA Duluth Regional Office

Attachment B

Vegetation Summary

Attachment B
Vegetation Summary
2011 Wild Rice Survey for Hibbing Taconite Company

Scientific Name	Common Name
<i>Alnus incana</i>	Tag alder
<i>Calamagrostis canadensis</i>	Canada bluejoint
<i>Carex sp.</i>	Sedge
<i>Ceratophyllum sp.</i>	Coontail
<i>Leersia oryoides</i>	Rice cut-grass
<i>Lemna sp.</i>	Duckweed
<i>Nuphar advena</i>	Yellow water lily
<i>Nymphaea odorata</i>	White water lily
<i>Phalaris arundinacea</i>	Reed canary grass
<i>Potentilla sp.</i>	Cinquefoil
<i>Rubus idaeus</i>	Red raspberry
<i>Sagittaria latifolia</i>	Arrowhead
<i>Salix sp.</i>	Willow
<i>Scirpus sp.</i>	Bulrush
<i>Sparganium angustifolium</i>	Narrowleaved bur-reed
<i>Typha angustifolia</i>	Cattail, narrow-leaved
<i>Typha latifolia</i>	Cattail, broad-leaved
<i>Urtica dioica</i>	Stinging nettle
<i>Zizania palustris</i>	Wild rice

Attachment C

Density Photographs

Density Level 1



Density Level 2



Density Level 3



Density Level 4



Density Level 5



Attachment C
Photographs Depicting Range of Wild
Rice Densities (1-5)

Attachment D

Photographs of Study Area

2011 Wild Rice Survey for Hibbing Taconite Company



Photo 1: Lost Pond – Stand SHR-A, Density 2 Wild Rice (Insignificant)

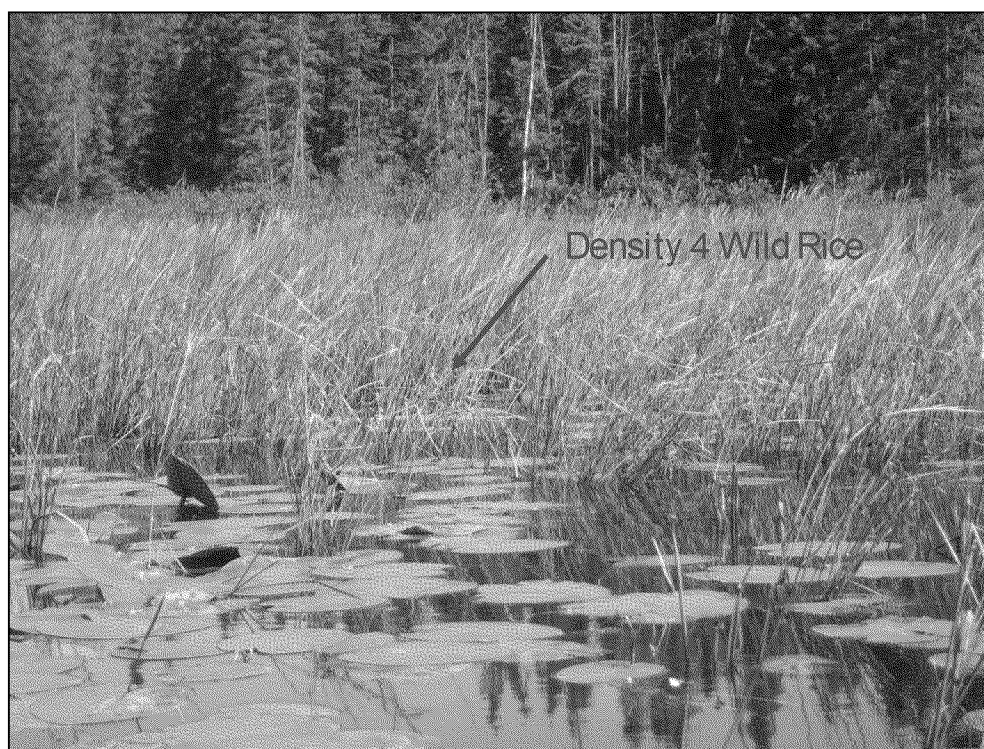


Photo 2: Shannon River – Stand SHR-B, Density 4 Wild Rice (Significant)

2011 Wild Rice Survey for Hibbing Taconite Company



Photo 3: Day Brook – Stand DB-A, Density 1 Wild Rice (Insignificant)



Photo 4: Day Brook – Stand DB-J, Density 4 Wild Rice (Significant)